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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/662,853	09/15/2003	Nelson A. Kelly	GP-303074	2134

7590 05/26/2005

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EXAMINER

ZHENG, LOIS L

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 05/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/662,853

Applicant(s)

KELLY ET AL.

Examiner

Lois Zheng

Art Unit

1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 14-37 is/are pending in the application.
- 4a) Of the above claim(s) 14-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 20-37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Claims

1. Claims 1-13 are canceled.
Claims 14-19 are withdrawn from consideration.
Claims 20-37 are currently under examination.

Status of Previous Rejections

2. Applicant's arguments, see pages 8-11, filed 8 March 2005, with respect to claims 20-21, 23, 25-32 and 36-37 have been fully considered and are persuasive. The rejection of 20-21, 23, 25-32 and 36-37 under 35 U.S.C. 103(a) as being unpatentable over Ayers US 4,466,869(Ayers) in view of Williams et al US 4,414,080(Willisams) has been withdrawn.

New grounds of rejection in light of newly discovered reference follow.

Status of Previous Allowance

3. The indicated allowability of claims 22, 24 and 33-35 is withdrawn in view of the newly discovered reference(s) to Deng et al. Study of Sputter Deposition of ITO Films for A-Si:H N-I-P Solar Cells, in Proceedings of 2nd World Conference and Exhibition on Photovoltaic Solar Energy Conversion, 700-703(Deng). Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

Art Unit: 1742

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 20-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ayers in view of Deng.

The teachings of Ayers are discussed in paragraph 4 of the previous Non-Final Office Action.

However Ayers does not explicitly teach the claimed indium tin oxide(ITO) layer having a thickness of greater than 3000 Angstrom.

Deng discloses an amorphous Si n-i-p solar cell electrode sputter deposited with a layer of indium-tin-oxide(ITO) film. The ITO film is made of $\text{In}_2\text{O}_3/\text{SnO}_2$, which may contain 90% of In_2O_3 (page 700, right column, 2nd paragraph). The structure of the electrode is ss/Ag/ZnO with a n-i-p semiconductor layer and the ITO layer is deposited on the p layer(page 700, right column, 3rd paragraph). Table 1 of Deng further discloses that the ITO film thickness in some of the samples exceeds 400nm(i.e. > 4000 angstrom). The ITO film is applied by sputter deposition in a vacuum chamber in an argon environment (page 700, right column, 2nd paragraph) and heated at 250°C in some of the samples listed in Table 1.

With respect to instant claims 20, it would have been obvious to one of ordinary skill in the art to have incorporated the ITO covered electrode of Deng into the device of Ayers in order to provide high current and good quality ITO films for amorphous silicon type electrodes as taught by Deng(page 702, right column, first and last paragraphs).

With respect to instant claims 21, 25-31 and 36, the claim limitations are not given any patentable weight since these claim limitations are directly to a process.

Art Unit: 1742

Process limitations are not given any patentable weight when determining the patentability of apparatus claims.

Even if the process limitations were to be given patentable weight, Deng's sputtering deposition process of ITO on a-Si electrode meets the claimed process limitations as recited in instant claims 21, 25-31 and 36. In addition, Deng further teaches the ITO deposition time is 30min(page 700, right column, last paragraph, Fig. 1). Even though Deng does not explicitly teach the claimed at least 60 min heating time, one of ordinary skill in the art would have been able to increase the heating time in order to allow longer deposition time and provide thicker ITO film whenever thicker ITO film is desired.

With respect to instant claims 22, 32, 35 and 37 of the instant invention, Ayers in view of Deng teaches that claimed photoelectrode with ss/Ag/ZnO substrate covered by n-i-p semiconductor layer and the ITO layer overlies p layer as recited in instant claim 22 which implies that n layer faces ZnO as claimed. Ayers in view of Deng further teaches ITO layer containing 90% of In_2O_3 balanced with SnO_2 as recited in instant claims 32, 35 and 37.

With respect to instant claims 23-24 and 33-34, the claimed predominately cubic-phase oxide with a small amount of hexagonal-phase oxide and the claimed highly oriented film of highly oriented crystal are inherent properties of the ITO film formed by the process of Ayers in view of Deng since Ayers in view of Deng teach a process that is substantially similar to that of the instant invention.

Art Unit: 1742

Response to Arguments

6. Applicant's arguments with respect to claims 20-21, 23, 25-32 and 36-37 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lois Zheng whose telephone number is (571) 272-1248. The examiner can normally be reached on 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LLZ


ROY KING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700